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ABSTRACT

Relating school learning to work can make adolescents take school more seriously. One mission of schools is to prepare the young to assume work roles. Schools were used to teach basic academic material and a work ethic that were equally applicable to a wide range of occupations. John Dewey argued that preparation cannot be effective unless it simultaneously addresses immediate needs and interests. Although U.S. vocational schools teach job-related knowledge and skills in preparation for employment, the German Berufsschule teaches the same lessons after employment has started. The Berufsschule comes about as close as possible to integrating instruction in job-related knowledge and skills at school and work. Schools should engage young people in critical reflection on their work experience as a means of fostering their ability to understand workplaces as sociotechnical systems and, using that understanding, to act constructively to improve them and to improve their positions in them. This is very different from seeking the direct transfer of job-specific knowledge and skills, general academic subjects, or of problem-solving strategies. Principles for practicing this integration include the following: (1) reflection is a process of discovery; (2) learners become action-researchers; (3) the social impact of technology should be examined; and (4) journals, critical incidents, and literature are useful aids to reflection. (23 references) (CML)

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LINKING SCHOOL LEARNING WITH LEARNING ON THE JOB

Stephen F. Hamilton

April, 1990

> The chief opportunity for science is the discovery of the relations of a man to his work -- including his relations to others who take part -- which will enlist his intelligent interest in what he is doing. (Dewey, 1916/1966, p. 85)

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Preface

This essay examines some of the ways in which learning in school and workplace can be connected and fixes on one: critical reflection in school upon work experience in order to gain deeper understanding of work; i.e., on the "opportunity for science" identified by Dewey. Descriptions and analyses of school classes that do this systematically would greatly enrich the effort, but I know of none, though some surely exist. Because this function of school in relation to work is part of my vision of apprenticeship (Hamilton, 1990), I hope to locate or foster the creation of such school classes in the future. Responses to the ideas presented here would help to guide that project.

Why Link School with Work?

One answer to this question is that relating school learning to work can make adolescents take school more seriously. Young people tend to view work as real and school as artificial. Learning geometry in order to be able to solve made-up problems in a textbook is not nearly so compelling as learning geometry in order to be able to survey a plot of land or fashion a metal object with a lathe. Knowing this, teachers like to urge their students to attend to lessons "because you will need this someday." Like the boy who cried wolf, teachers lose their credibility as students hear this line repeated year after year. Widespread part-time employment further weakens the point because most of the jobs for which teenagers are hired make little use of school skills (Borus, 1984).

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A second answer is simply that work is a fundamental human endeavor and, as such, should guide and be the focus of much that goes on in schools. One of the missions schools were invented to fulfill is preparing the young to assume work roles. In societies relying on agriculture and handcrafts, schools were not needed for this purpose because most methods of earning a living could be learned by informal means. Horace Mann championed public elementary schooling for all because citizens of a democracy were expected to be able to read newspapers and understand the nation's governing principles and because literacy was required in a growing number of occupations.

Work-related learning includes more than just literacy. From their beginnings, the common schools attempted to inculcate the work ethic along with the three R's. By demanding punctuality and rewarding diligence they fostered behavior suited to an industrial economy. Moreover, by treating children as members of categories based on such criteria as age and previous performance and by associating authority with office (rather than with age and affectional ties as in families) they socialized children to function in large bureaucratic organizations (Cremin, 1977; Dreeben, 1968; Parsons, 1959).

Schools were used to teach basic academic material and a work ethic that were equally applicable in a wide range of occupations. Such general lessons were sufficient for nearly all young people until the turn of the century, when accelerating industrialization, urbanization, and new immigration led to ever-increasing enrollment in secondary education. For the first time, large numbers of pupils entered secondary school with no expectations of pursuing higher education. Coupled with the democratic ideology that saw schools as avenues of upward social mobility, increasing enrollment in high schools posed a serious dilemma. The heavily academic pre-college curriculum seemed

inappropriate for all high school students, yet to bar from high school young people anxious to continue their education violated the ideal of openness. The solution was vocational education, which gave the schools a new function with regard to work, teaching future workers exactly how to perform the tasks they would encounter in their jobs (Lazerson & Grubb, 1974).

Learning Job-related Knowledge and Skills in School: Vocational Education

Vocational education was established primarily to teach young people, especially young men, knowledge and skills that they could use at work. This purpose reflects the most obvious link between school and work. However, Dewey, who advocated manual training as a form of general education and resisted job training in schools, identified a serious weakness in this link, which applies as well to the teaching of academics in school: the fallacy of school as preparation.

> *A person, young or old, gets out of his present experience all that there is in it for him at the time in which he has it. When preparation is made the controlling end, then the potentialities of the present are sacrificed to a suppositious future. When this happens, the actual preparation for the future is missed or distorted. The ideal of using the present simply to get ready for the future contradicts itself. It omits, even shuts out, the very conditions by which a person can be prepared for his future. We always live at the time we live and not at some other time, and only by extracting at each present time the full meaning of each present experience are we prepared for doing the same thing in the future. This is the only preparation which in the long run amounts to anything. (1938/1963, p. 49)*

Dewey did not claim that school does not and should not prepare young people for the future, but that preparation cannot be effective unless it simultaneously addresses immediate needs and interests.

In the four decades spanning the turn of the twentieth century, when vocational education was established in the United States, German apprenticeship was transformed to serve a newly industrialized economy. Georg

Kerschensteiner, a Munich school official and admirer of Dewey, contributed to this process by combining apprenticeship with the Berufsschule, a part-time vocational high school attended by apprentices to complement their on-the-job training. Together, apprenticeship and Berufsschule are known as "the dual system." Kerschensteiner pointed out that in Germany vocational schooling was designed to accompany apprenticeship while in the United States vocational schools were introduced explicitly to replace apprenticeship (Douglas, 1921). Another way to state this contrast is to say that U.S. vocational schools teach job-related knowledge and skills in preparation for employment, while the Berufsschule teaches the same lessons after employment has commenced.

School and Workplace as Complementary Learning Environments: The Berufsschule

The Berufsschule contrasts with vocational schooling in the United States by teaching apprentices about their occupation at the same time that they are learning by working. Moving from school to work and back again makes the link reciprocal rather than unidirectional. Typically, apprentices attend Berufsschule one day each week, but an alternative arrangement, block instruction, enrolls them full-time periodically for five or six weeks at a time. In either case, apprentices spend approximately 20 percent of their training time attending the Berufsschule, where they study general subjects, especially German and social studies, and spend the remainder of their time in subjects directly related to the occupation they are learning. In large cities, Berufsschulen are highly specialized, dividing apprentices into very strictly defined occupations, separating, for example, middle-level office workers (Kaufleute) apprenticed in industrial firms from their counterparts in banks or in firms engaged in wholesale commerce.

The link between school and work (Berufsschule and training firm) has

several components. Most important is the apprentices' movement back and forth between school and workplace. In addition, the Berufsschule curriculum is determined by joint committees involving teachers, labor union representatives, and employers' representatives, who comprise the majority of each committee. As a result, the work-related knowledge and skills apprentices are taught in school are those employers want them to know. Apprentices' mastery of the curriculum content is assessed by a national qualifying examination that each must pass in order to practice her or his occupation. Hence, incentives for learning school material are strong. Following is a brief account of work-related instruction in a Berufsschule for mid-level office workers in industrial firms, Industriekaufleute, an occupation encompassing secretaries, bookkeepers, personnel officers, inventory controllers, and Sachbearbeiter -- executives responsible for the firm's dealings with suppliers.

> The teacher, Frau Wolff, teaches both social studies and Fachrechnen, business math. At the close of social studies, she introduces math by quickly running through the homework, which involved pricing. She explains in this connection the tax placed on imported goods to compensate for the value added tax charged on domestic goods.
>
> The new topic for the day is Vorkalkulation, which an apprentice correctly defines as the calculation made before a product is sold to determine what price should be charged. Frau Wolff then puts on the board a simple formula for calculating the production cost of a mass produced item. She then breaks down the numerator of the formula, "total costs" in two ways: first, by type of cost -- materials, personnel, write-offs, maintenance, taxes, insurance, other; second, by cost center -- materials, manufacturing, administration, plant operations. The results of these calculations, with values supplied by the teacher for the exercise, are then entered into further calculations that include profit in order to determine a desired sale price, not forgetting taxes, discounts, and rebates.

Here is a lesson for apprentice Industriekaufleute to sink their teeth into. It is concrete. It applies directly to real work they are doing. The

teacher's emphasis on the topic is assurance enough that they will be required to solve some problems of similar form during the qualifying examination.

Yet even in this lesson, which appears to exemplify the linkage of school and work, some significant gaps remain. Apprentice/pupils' level of attention was not as high as the teacher surely hoped. They engaged in side conversations and some loud joking. Questioned later about the applicability of his Berufsschule lessons at work, one apprentice in the class replied that it was the other way around: he used at school things that he learned at work. He went on to say that Berufsschule instruction was important primarily for the qualifying examination. The problem, he said, is that theory is always different from practice. "Fine, you learn a few key words, but you would learn those on the job."

Another apprentice in the same firm said Berufsschule instruction in accounting was useful for those in small firms but that in her firm (a manufacturing firm of international renown) the processes were all computerized and did not operate in textbook fashion. Yet another, who said he made some use of school instruction at work, noted that it was not as important to him as to apprentices in firms where training was of lesser quality than his. For them, he said, school instruction was the only hope of passing their examination because they would never learn the material on the job. Of the eight Industriekaufleute who were interviewed, six said that they used at work lessons they learned in the Berufsschule. All eight said their social studies lessons contributed to their role as citizen.

> A class of apprentice auto mechanics is assembled for Fachtheorie, a course on the principles underlying auto repair. The teacher, Herr Kohl, announces that the morning's lesson will be about a particular kind of problem with transmissions. He begins by asking questions to review the previous lesson and make the connection. Many of the apprentices raise their hands in response

to each question and those called on answer correctly.

Next, Herr Kohl holds up a transmission part and talks about synchronization, writing the word on the board. Following more questions and answers, Herr Kohl places the part he has been talking about with several others on an overhead projector, which displays their profiles on the screen. He turns one gear inside another, grinding the gears, and identifying the sound as the one they will hear if a problem occurs.

The lecture/discussion continues with a rehearsal of the names of the displayed transmission parts. Next the apprentices receive worksheets on which they are asked to fill in the part names. After they finish, Herr Kohl uses an overhead transparency of the worksheet to supply the correct answers.

The second half of the 90-minute class includes more of the same type of instruction and two short films depicting transmission functions and malfunctions. The parts are also passed around the class.

This was a typical scene in a Berufsschule class, the teacher drilling apprentices on technical information that is not completely new to them. They have previously been exposed to it through a combination of reading, classroom instruction, and work experience. Like the Berufsschule class for Industriekaufleute, this class illustrates a reciprocal connection between learning at school and at work. The same information might be acquired in either or both locations. At work it might have practical utility. In school it can be produced to perform an exercise correctly. A major motivator for learning the information is that it might appear on the qualifying examination.

Apprentice auto mechanics were mostly positive about the application of their school learning at work. One expressed reservations because the technology found in the German automobiles constantly used as examples in the Berufsschule differs significantly from that in the Italian and British imports repaired by the garage where he was trained. Another pointed to the impossibility of sequencing lessons appropriately for all, complaining that he

had learned about brake systems in the Berufsschule six months after beginning to work on them. In general, the auto mechanics were more satisfied with their Berufsschule experience than the Industriekaufleute, especially in contrast to their previous school experience.

Limitations to the Transfer of Learning from School to Work

In its purpose and structure, the Berufsschule comes about as close as possible to integrating instruction in job-related knowledge and skills at school and at work. Yet apprentices saw limits on the applicability of school instruction to work. This observation raises the issue of how school learning might best be linked to learning at work.

Lave (1988) has offered an explanation of why the integration is difficult. With reference to the transfer of school learning to everyday life, namely, the use of school mathematics in grocery shopping and cooking, she argued that school learning is too abstract and formulaic to be useful in solving the messy, undefined, multidimensional problems of real life. Her key claim is that problems do not exist independently of their solutions in the context created by persons acting in particular settings. (See also Scribner, 1984.) Hence, no direct transfer can be expected. Her critique is powerful and illuminating, and it sets a high standard for any claims that school learning carries over directly to working life. However, she does not go so far as to claim that people who use reading and math in their jobs would be able to do them as well without school.

Instead, Lave presents a powerful argument that the transfer of school learning is limited by the nature of schools. Apprentices' comments, their sometimes less than rapt attention and particularly their claim, reinforced by teachers' comments, that Berufsschule instruction has more to do with passing

the qualifying examination than performing on the job all suggest that the strongest link between Berufsschule and workplace may not be apprentices' use in the latter setting of knowledge and skills acquired in the former, though most do that to some degree.

Understanding Work via School-based Reflection

One of the Industriekaufleute apprentices in the first classroom described above said he did not use at work precisely the accounting methods taught in school, but he claimed that learning about accounting in school gave him a better understanding of what he was asked to do at work. This perception broadens the notion of transfer from learning in school specific skills to be used at work to gaining in school a general understanding of what transpires at work. The distinction is between teaching <u>how to</u> work and teaching <u>about</u> work. Career education is distinguished from vocational education on precisely this ground, but the problem with career education is that in most cases it remained didactic and school-bound. The same students who fail to take history seriously because it is taught in school miss the potential lessons of career education in the classroom because it is too abstract and desiccated. Especially among high school students, more than half of whom are employed during the school year, even more among seniors, (Lewin-Epstein, 1981), work is not a distant future prospect but a daily experience. Using that experience as a basis for schoolwork could deepen education substantially.

Understanding, getting the whole picture, is not identical to transferring knowledge and skills from one place to another. It is a higher-level process and a more important one. Whitehead put it this way:

> Your learning is useless to you till you have lost your text-books, burnt your lecture notes, and forgotten the minutiae which you

learnt by heart for the examination.

Even more succinctly, he said,

> Education is the acquisition of the art of the utilisation of knowledge. (1929, pp. 38, 16)

In this spirit, schools should engage young people in critical reflection on their work experience as a means of fostering their ability to understand workplaces as socio-technical systems and, using that understanding, to act constructively to improve them and to improve their positions in them. Dewey's (1933/1966) notion of reflection captures this function. He described reflection as the process that transforms experience into education. It is not until a person has pondered the meaning of an experience in the context of past experiences and future aspirations that it becomes educational. Freire (1970), drawing on the Marxian idea of "praxis" as the combination of reflection and action, described an approach to teaching adult literacy that he claimed was both effective pedagogy and effective political education because it teaches not only how to read but how to analyze, understand, reflect upon one's position in a social, political, and economic system.

Taking a cue from Dewey and Freire, one might look to the Berufsschule as a place in which apprentices would reflect critically upon their work experience. They would be encouraged in school to consider the workplace problematic, rather than to accept it as immutable. During my observations of Berufsschule classes, only one incident occurred that illustrates this process, but it was intriguing enough to repay attention. It occurred in the school for Industriekaufleute.

> The lesson concerns financing. Herr Pelz distributes a handout and then lectures from an identical overhead that sets out in tabular form types of financing, by source (internal/external), form, method of repayment, and impact on a firm's total capital. In the process he distinguishes between colloquial and technical

> definitions of investment and asks the apprentices for examples of different types of investment. They respond with such examples as investment in plant, investment in training. One apprentice offers investment in quality (Qualitätsinvestition). Herr Pelz replies that this term is a euphemism adopted by the large firm in which the apprentice is being trained for investment in automation (Rationalisierungsinvestition). The firm prefers it because it does not sound so much like eliminating jobs.

This brief aside by the teacher, which occasioned no discussion, was the closest a Berufsschule teacher came in my presence to encouraging critical reflection by apprentices. Another lectured during a social studies class about the connections among arms expenditures, interest rates, and the number of workplaces, and urged his pupils to look for connections, but he only modelled the search for connections; he did not engage them in it. (The scarcity of such incidents should be reassuring to German employers, some of whom told me the Berufsschule was weakened by the adherence of most teachers to the Social Democratic Party, which is aligned with organized labor.)

Linking school learning with learning in the workplace in the form of critical reflection on work is very different from seeking the direct transfer of either job-specific knowledge and skills or of general academic subjects or of problem-solving strategies. It treats the classroom as a protected site for analyzing personal and collective experiences at work in order to enhance young workers' ability to act effectively in the systems in which they are located and ultimately to transform them.

There are numerous barriers to this type of learning, some inherent in the conservative nature of large bureaucracies and of established professions like teaching. However, although this agenda is surely a political one, it has become less radical as employers seek to implement new forms of work organization that involve higher levels of worker participation. In any event, the challenges to using classrooms in this manner are also pedagogical,

and those are the ones to be addressed here.

One pedagogical barrier to using students' work experience as a focal point for lessons about American society is the simple fact that their experience is diverse. A teacher who assigns some pages of a history book or some algebra problems has a relatively constrained universe of experience to respond to the next day. True, some students will have failed to do the work, others did it superficially, and some got all the answers right without approaching understanding. But a certain commonality can safely be assumed. With work experience, the teacher must assume substantial diversity. However, that need not be a negative feature. The teacher may be able to use that diversity as a means of teaching about working life by encouraging comparison.

Recommendations for Practice

What would a classroom look like in which the teacher systematically attempted to help students draw on their own work experience in order to come to a fuller understanding of the nature of the American economic, political, and social systems and of their place in them? Dewey's exhortations provide a starting point. Boud, Keogh, and Walker (1985) have assembled essays on various approaches to reflection. Useful models are provided by Freire (1970), and by advocates and practitioners of experiential education including Newmann (1975), Wigginton (1985), Conrad and Hedin (1986). The following principles emerge from these sources.

1. <u>Reflection is a process of discovery.</u> Rather than a didactic process in which the teacher knows and tells the learners, reflection is a mutual process placing the teacher in a facilitating role. Each learner is an expert on her or his experience. Engaging in reflective discussion with the teacher and other learners fosters the adoption of new perspectives and increases

understanding. This principle places heavy demands on both teachers and learners, who are equally accustomed to the didactic mode. Teachers must learn to use their wider knowledge and more extensive experience to pose questions and urge further thought rather than to answer questions and close discussion. Learners must be willing to take responsibility for their own education and for helping others learn as well. Wigginton's (1985) account of the birth and growth of Foxfire magazine provides a vivid illustration of this process.

2. Learners become action-researchers. When the classroom is used as a location for reflection, experience continues. One result of the reciprocation between reflection in and action outside the classroom is that learners hone their skills as observers and begin to ask new questions and gather new information at work. Wigginton's students illustrate this role when, as journalists, they interview people for stories. Freire (1970) described a process in which professional psychologists and sociologists conduct observations in a community where a literacy project is to be started in order to gather data about the conditions of life there that will serve as a basis for reading lessons and political discussions. As researchers, learners must take responsibility for substantiating their impressions about conditions at work. They must find ways of subjecting those impressions to empirical tests and exposing them to disproof. Diversity is constructive in this regard because learners may challenge each other to demonstrate that conditions in two different workplaces are alike or different in specific ways, searching for appropriate evidence and weighing it together,

3. The social impact of technology should be examined as well as its workings. The insight of British scholars that workplaces may be viewed as

socio-technical systems suggests that both the social and the technical components deserve attention. The first two Berufsschule lessons described above illustrate classroom instruction on the technical aspects of work. The need for such instruction is widely accepted. The general lack of instruction or reflection on the social aspects of workplaces indicates that its importance is not acknowledged. Workers who use technology obviously need some understanding of how to manipulate it in order to perform their jobs, whereas workers need to understand workplaces as socio-technical systems only if they are expected to manipulate those systems too, as they are in quality circles and other forms of worker participation in management.

4. Journals and critical incidents are useful aids to reflection. Reflection entails both observation and analysis of phenomena that seem to most people to require neither. In addition to discussing these phenomena, learners can become more acute observers by keeping journals, which then provide critical incidents for analysis, both individually and collectively (Conrad & Hedin, 1987).

5. Literature is another aid to reflection. The use of learners' journals suggests a similar use of material from literature to sharpen observational and analytic skills. In his outline for an English-social studies course on citizen participation, Newmann (1975) described such a use of literature. The list of possible sources is long; in fact, putting together such a list can be an enjoyable game. The greater challenge is for learners to make connections between their own work experience and those reported in fiction and nonfiction. This challenge suggests a parallel between the reflective process and literary criticism. A critic tries to understand, as I.A. Richards put it, "How does a poem mean?" That is, the

issue for a critic is not simply what a work of literature means but how it has its effect. A teacher in the kind of classroom described here can be seen as teaching students to "read" a workplace in the same way that a literature teacher teaches the reading of texts. Thus, using literature has two complementary purposes. It provides insights and critical incidents from a wider range than the learners' own experience -- and from some profound observers -- and literature offers an approach to analysis with clear parallels to analyzing workplaces. Note that the literary perspective is an alternative or complement to the social-scientific perspective recommended previously.

Conclusion

What are the prospects for schools fostering reflection of this nature? Two pedagogical obstacles are the capacities of teachers and students. The type of analysis described above assumes the capacity for abstract thinking. Most adolescents think of their workplaces in interpersonal rather than systemic terms. Most adults probably do too. Yet there is some reason to believe that new opportunities for action expand people's cognitive capacities. My colleagues and I (Hamilton, Basseches, & Richards, 1985) were encouraged in this belief by a study of youth in participatory workplaces. Luria (1976) found such an effect among Asian peasants as they assumed active roles in governing their communities for the first time during the Russian Revolution. It may be that encouraging young people to think critically about their work experience will expand their cognitive capacity.

The view of schools implied by this function -- that they are guardians of democratic values -- is familiar despite the assaults on its reality launched by empirical and theoretical studies from Hollingshead (1949) to

Bowles and Gintis (1976). The problem is that schools can never take the vanguard in challenging the power structure of the society they are intended to perpetuate. However, Carnoy and Levin (1985) have recently contended that schools, as agents of the democratic state, are well-placed to further progressive agendas, unlike workplaces, which are privately owned.

There is another cause for hope as well in the kinds of changes currently being implemented in both manufacturing and service industries. Ten years ago, people who advocated humanizing workplaces were easily dismissed as unrealistic ivory-tower types. However, the rise of Japanese industry and the impact of new technology have finally challenged the precepts of scientific management and such organizational changes as worker participation and job enrichment are now considered smart business. Although there are still plenty of jobs available for store clerks and custodians, an increasing proportion of jobs require communication and thinking skills of precisely the same nature as those championed by proponents of active citizenship and personal fulfillment. To the extent that employers need workers who are capable of understanding and transforming workplaces, they will have reason to encourage schools to sponsor critical reflection.

The most serious obstacle to achieving this vision of the link between learning at school and learning at work, therefore, remains the capacity of teachers. It is not at all obvious that very many teachers have the cognitive capacity, the knowledge of workplaces, appropriate academic background (industrial sociology and psychology, organizational behavior and development, political theory, economics, etc.), and the teaching skill that are required to do what should be done. That may be the ultimate limitation, but the example of master teachers like Eliot Wigginton and Paulo Freire and their

ability to communicate their methods to others leaves room for hope.

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